Report

from the International Workshop on

Coping with Drought: Best Use of Climate Information for Farmer Decision Making

Kadoma Ranch Hotel & Conference Center
Zimbabwe
4-6 October 1999

ACKNOWLEDGEMENTS

UNSO/UNDP has joined forces with the World Meteorological Organization (WMO) and has launched a project to strengthen drought preparedness and mitigation efforts in Africa. This effort has been reinforced by the US National Drought Mitigation Center (NDMC) based at the University of Nebraska. We would like to express our appreciation to the US Agency for International Development (USAID), the US National Oceanographic and Atmospheric Administration (NOAA), and the Global Mechanism of International Fund for Agricultural Development (GM/IFAD) for their financial contributions to the initial stage of the programme development. We would also like to applaud the Zimbabwe National

Meteorological Department and the UNDP Harare offices for hosting the workshop and assisting with local logistics.

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1. INTRODUCTION AND BACKGROUND

Drought is a major threat to sustainable livelihoods in dryland areas of Africa, particularly in arid and semi-arid regions. Past drought response programs have been reactive and highly centralized and have done little, if anything, to reduce the impacts of future droughts. An emerging approach in drought management is to place greater emphasis on preparedness and mitigation as a means to identify vulnerable sectors and population groups in advance of drought events. This approach is aimed at reducing the risk associated with drought with a concomitant reduction in economic, social, and environmental impacts. This new approach is reflected in UNSO's program on Drought Preparedness and Mitigation (DPM) which is in the context of National Action Programs (NAP). NAP is the main framework of implementing the Convention to Combat Desertification and Drought at the national level. As a part of the overall programme on DPM, a sub-initiative has been launched to improve farmer access and use of climate information.

The overall goal of this project is to provide farmers with better options to cope with drought and thus reduce the risks associated with this extreme climatic event. An essential assumption is that the transfer of quality climate information to the most drought-prone communities can minimize the impacts of drought and boost capacity of farmers to cope with climate variability. There is a growing awareness that investments in drought and climate-related information and communication or delivery systems can help reduce the impacts of drought and other extreme climate events on agriculture and other weather-sensitive sectors. To do this, the value of this information at the farmer level must be assessed. The design of delivery systems can only be improved if we understand the successes and failures in delivering high quality and timely information to farmers and by learning more about how they use, or why they do not use, this information in the decision-making process.

The intention of this project is to capacitate farmers to make better use of indigenous and contemporary knowledge on climate and drought. In order to accomplish this goal, improved co-ordination between the meteorological, hydrological, and agricultural services is essential. Other critical components include timely delivery of climate information to farmers in a format that can be easily understood and training of agricultural extension officials and farmers on the application of that information to farm-level management decisions. Drought has direct implications for poverty and environmental degradation, two problems that plague the African continent. This initiative will promote food security in the dryland areas of developing countries in Africa and elsewhere.

The project is being conducted in three phases: A preparatory phase commenced in January 1999 which involved a literature review, developing contacts with potential sponsors and cooperating organizations, and the planning and designing of a workshop. An International workshop, *Coping with Drought in Sub-Saharan Africa: Best Use of Climate Information*, was

held in Kadoma Ranch Hotel and Conference Center, Zimbabwe on 4-6 October 1999. The third and fourth phases of the project will be a three to five year implementation phase with pilot projects in three countries in Sub-Saharan Africa. This report summarizes the main results and outcomes from the research and preparatory phase, and the international workshop. The full proceedings of the workshop will be published.

2. MAIN OUTCOMES OF THE RESEARCH/PREPARATORY PHASE

Most of the effort during this phase was concentrated in preparation for the workshop, identification of interested partners, literature review, and country surveys.

Given the paucity of information and knowledge on topics dealing with application and value of climate and drought forecasts in farmer decisions, the project sought answers to the following key questions which were later used to develop the workshop theme:

- Where and how does the farmer get information on climate and drought?
- How does the farmer use climate and drought information?
- Which information on climate and drought is most critical?
- What is the capacity of extension services in transferring climate and drought knowledge between farmers and meteorological departments?
- Which key local organizations, institutions, ministries and local NGOs are involved in disseminating and interpreting climate and drought information?
- What are some of the successes and failures of similar approaches or projects?
- What research on indigenous and contemporary knowledge on climate and drought is currently underway and how can it contribute to this project effort?

Farmer focussed surveys within six case study countries in Africa were conducted. These countries were: Ethiopia, Kenya, Mali, Mozambique, Senegal and Zimbabwe. The selected countries are good examples of the diversity of African economic, political, cultural, social, biological, and physical realities. National consultants were recruited in each country to conduct the surveys. The surveys appraised the types of climate products and services provided at the mandated institutions, the delivery of that information to farmers, and its level

of adoption and application in decision making. Selected areas were mostly arid and semi-arid with mixed land use systems (crop and livestock). The most common crops were maize, millet, sorghum, and groundnuts. The sphere of the survey areas did not include pure pastoral systems, which should nevertheless be considered as a possible target for programme development. The survey encompassed geographical areas with diverse socio-economic factors e.g. land tenure, income of respondents, ethnic groups etc. The consultants prepared reports summarizing their discussions with farmers that they presented during the workshop. An summary of the six country reports was also prepared and distributed to the participants prior to the workshop.

METHODS

Rapid appraisal of indigenous knowledge on climate and drought was the main tool used for the survey. In order to standardize survey results for comparison and workshop discussion purposes, a questionnaire on uptake and use of contemporary climate and indigenous climate forecasting was developed and distributed to all the national consultants. The consultants, in turn, modified the questionnaire to suit their own circumstances which they used with a combination of other methods e.g. focussed group discussion, participatory, key informant survey, literature review etc., to obtain the required information. The Mali and Senegal reports mentioned results from present and past project experience to introduce climate information within a treatment and control experiment.

RESULTS

The national consultants came from different disciplinary backgrounds. Consultants from Mali, Senegal, Mozambique, and Ethiopia were from meteorological departments. The Kenyan consultant was a University Lecturer with a background in management of arid and semi-arid lands. The Zimbabwean consultant works in rural development. The background of the consultant influenced the perspective presented in the national reports, with the meteorologists concentrating on product development and applications, and the other two focussing more on extension systems and uptake.

a) Information at the farmer level

Some of the farmers interviewed, particularly those living further from urban centers indicated that they do not receive contemporary climate information. ***The majority of those who receive information do not use it in their farm decision process***. Most of the farmers trust indigenous climate predictions more than contemporary climate forecasts, except, possibly, in the project

areas from Mali. The reason they gave was that contemporary information is too general and not specific in time and space. Furthermore, the information is received too late for the farmers to adjust their management practices. Therefore, the reliability of contemporary climate information for farmer decision making was cited as a real challenge.

The most important climate products being requested by farmers are seasonal forecasts, although shorter-term forecasts are needed to support decisions about when to apply fertilizers, etc. They want to know when the rainy season will begin and end and whether the season will have below normal, normal, or above normal rainfall. The farmers are requesting reliable forecasts and timely information delivery. Farmers also indicated that the information is often too technical for their easy use.

b) Dissemination mechanisms

The most common channels for delivering these products and services to farmers are: agriculture extension services, radio, TV, NGOs, word of mouth, newspaper, electronic media, periodic publications, (pamphlets/ bulletins), international weather Institutions, Internet, etc.

The main problem cited was ***too many stages in the delivery system*** such that farmers receive distorted information. The probabilistic nature of climate information is lost through the delivery system, and the farmers often interpret the information in a deterministic manner.

Although the agricultural extension system plays a role in information transfer, ***there is rarely a formal, institutionalized system of delivering information to the farmers***. Furthermore, ***little effort has been made to obtain feed back***. The consultants identified the following as the main barriers to reception and use of contemporary climate products: language, illiteracy, and ethnic and cultural diversity.

c) Climate information products

At the institutional level, statistical methods are used to forecast climate in terms of normal, below normal, and above normal (or in case of Senegal wet, normal, and dry period). There is a general recommendation that these yardsticks of measuring climate need to be standardized to enhance their application in decision making. Maps, tables and other products are developed based on these forecasts and are expressed in terms of probability. Short-term forecasts are produced for making tactical decisions e.g. dates of planting and harvesting, weeding, pesticide and fertilizer applications. These climate products include, 72 hour, 10 day, weekly and monthly forecasts.

d) Indigenous and contemporary information interface

There is a striking similarity between indigenous and contemporary climate indicators. For instance, both indigenous and contemporary forecasts use wind direction, clouds, and temperature. Indigenous climate predictions are also based on plant and animal behavior. Farmers also perform rainmaking ceremonies. (NB: We note that indigenous perception and definitions of drought are in line with definitions of drought provided by Convention to combat Desertification (CCD)). When the contemporary climate forecasting deviates from traditional forecasts, farmers' inclination is to trust indigenous information. The reason that farmers gave is well noted in the Kenya report: "it blends well with the culture, has been tested, tried and trusted and is also in a language that the farmers understand".

e) Recommendations

The following are the main recommendations from the survey. These were indirectly fed into the workshop phase for further discussion.

- Institutional capacity needs boosting through provision of better equipment and more personnel training.
- Improved networking among the institutions that deal with climate and drought forecasting and management.
- Use of mobile libraries and farmer cooperatives was recommended by the Zimbabwean consultant.
- Training at all levels of climate information (production, delivery and use).
- Development of suitable climate models.
- Improve geographic specificity of climate information.
- Integration and harmonization of contemporary products with traditional indicators.
- Research how to introduce the notion of forecast probability in information transfer.

3. SUMMARY OF WORKSHOP CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

The workshop objective was to identify the main programme components including how, and where they could be implemented.

The tasks were to:

Define elements of a program that will address gaps that exist between climate information products and services provided by meteorological, agricultural, and hydrological services and the ability of farmers to access and use this information in support of decision making;

1. Demonstrate how climate information can be incorporated in farm-level decisions to reduce the impacts of drought on agricultural production and to maximize productivity during more favorable growing conditions; and

2. Develop a strategy to implement pilot studies in selected countries in Sub-Saharan Africa.

WORKSHOP DESIGN

The workshop format included a combination of plenary sessions with technical presentations on topics such as the state-of-the-art in seasonal climate forecasts and case studies from other countries on the use of climate information, panel discussions, and breakout discussion groups. This format was adopted to ensure discussion and encourage interaction among workshop participants. Participants of the workshop included Zimbabwean farmers; representatives from African meteorological, agricultural, and hydrological services, including agricultural extension officials; representatives from NGOs, SADC, AGRHYMET, and ACMAD; Drought Monitoring Centers located in Kenya and Zimbabwe; and international drought experts from USA, and Australia (see list of participants in the annex).

Workshop presenters were asked to address specific questions. For example, farmers discussed the types of contemporary climate information they incorporate in decisions about what and when to plant, the source of that information, and its value in the decision making process. They discussed how indigenous information is used. If climate information is not used, farmers were asked to identify reasons for its lack of use. Extension officers were asked to address their perceived qualifications to advise farmers on the best use of climate

information and identify specific successes and failures in providing climate information to farmers. If extension officers did not feel qualified to advise farmers on the best use of climate information, what type of training would be helpful in achieving the necessary skills? What opportunities exist to deliver climate information to farmers? A similar approach was applied to representatives from meteorological, agricultural, and hydrological services in terms of product identification, form of product delivery, and product evaluation.

The first day of the workshop concentrated on identifying user needs, constraints, and opportunities in relation to climate and drought forecasting information. A farmer and extension services panel followed the summaries of the country surveys. The farmers provided a list of indigenous climate and drought indicators and pointed out types of decisions they make based on these indicators. Some of the most remarkable questions arising from panel presentation targeted what the farmers do if indicators disagree and how the farmers verify traditional indicators. The farmers responded that, at a local scale, indicators do not disagree. However, the interpretation of these indicators should not necessarily be applied to other regions. To verify traditional indicators, farmers often consult the spiritual medium.

The second day of the workshop addressed the following questions that were based on the output from the first day:

- What are the five most important needs of the agricultural community for climate information?

- What gaps exist between climate products and needs and what are the principal measures by which these gaps can be addressed?

- What measures should be taken to blend traditional knowledge with contemporary climate forecast?

The workshop also benefited from messages received through technical presentations that helped in identifying the gaps between products and services and ability of farmers to access and use climate forecasts. This critical information ranged from the role of the African desk of NOAA, who provided information on types of products and services and how it is injected into regional and national information systems.

The case study of Peru fishing industry was very unique and greatly enriched the workshop. This particular presentation provided an example of use of climate information by fishermen not just for making decisions on where to get a good catch but also to increase their competitive advantage in the fish market.

A presentation of an Australia case study provided lessons on use of climate forecast in a situation where a national drought policy is in place. Furthermore, the Southern Oscillation

Index (SOI) is a good predictor of rainfall because of the high correlation between the two variables.

The status of climate information at the regional level was captured through presentations from ACMAD, Drought Monitoring Centers in Harare and Nairobi.

The final day of the workshop was devoted largely to the development of a program action plan for the third phase of the project. Participants were requested to base their discussions on the most important needs, gaps identified during the first and second day of the workshop. The following were the main tasks for the discussion groups:

- Define and prioritize the expected outputs of a programme to tailor climate information products, information delivery, and training to meet user needs.
- Given output priorities, identify the key activities to achieve these outputs, including timelines and inputs where appropriate.

WORKSHOP OUTPUT

Farmers use a variety of traditional indicators to predict climate. However, farmers also expressed their need for contemporary climate forecasts. The types of information that they find critical in their decision making are: start and end of the rainy season (length of the season), amount of total rainfall received in the season, short range forecasts for tactical decisions, and medium range forecasts. They also need information on extreme events such as floods, droughts, etc.

a) Constraints

Several factors are hindering farmers' from accessing and using climate information. The quality of information and its timeliness were identified as key constraints. The farmers also indicated that they do not understand contemporary climate information because it is usually too technical. Furthermore, climate products that are usually expressed in terms of probability are interpreted by farmers in a deterministic manner. There was common observation that traditional indicators are ignored during product development at national meteorological departments. There is general lack of interaction among the stakeholders of climate forecasts i.e. the users, producers, and communicators. The lack of understanding among scientists and practitioners of quantitative value of climate forecast at farmer level came out very strongly during the discussions.

Lessons from various sessions indicated that the system of delivering information to farmers is far from being reliable. Whereas the most common medium of communicating with the farmer community is the radio, there are other channels that are neither formalized nor institutionalized. This makes verification of information very difficult.

b) General recommendations

Several solutions were proposed to overcome these constraints. They include:

- the need to enhance farmers' understanding of the forecasts;
- training of both extension workers and farmers in interpreting and applying climate products was proposed as a way of achieving better uptake;
- the quality of the forecast needs improvement possibly through better spatial coverage;
- the integration of traditional and contemporary indicators was highly recommended. To this end, further study of the bio-physical phenomenon underlying indicators was proposed;
- it was also recommended that traditional indicators be used in scientific forecasts.

c) Programme elements

Common expectations across western, southern, and eastern regions of Africa, based on the output of the workshop, are:

- The need for further research to assess the quantitative value of climate forecasts in agricultural decisions was strongly implicated;
- More effort needs to be dedicated to improving communication or dissemination of climate products. A mechanism of getting feed-back from farmers needs to be put in place.
- Furthermore, users of climate products need help in understanding and applying that information in decision making. This should be in the context of establishing a common language between users and producers. Blending of indigenous and contemporary information can enhance understanding.
- Improvement of the quality of the forecast was also proposed. Research in this field was suggested.

FUTURE STEPS OF THE PROGRAMME

The most immediate task is to develop and implement pilot projects within selected case study countries based on findings from the first and second programme phases. In order to achieve this objective UNDP/UNSO, WMO, NOAA, NDMC, and other partners propose to undertake the following steps.

a) Drafting of workshop proceedings:

This activity has already started and the expected date of completion is 15 December 1999. The output is a document containing summaries from panels, breakout groups, and technical presentations. Recommendations from all the sessions are included.

b) Development of a programme document.

This activity will start in November, 1999. The anticipated date of completion is the end of January 2000. The output will be a programme document targeting western, eastern, and southern African regions. The document will prioritize research and training needs as identified during the workshop. The document will also include steps to accomplish these tasks and an estimate of resources necessary to implement the programme.

c) Building partnerships and resource mobilization

The identification and establishment of international and national partners and donors is critical:

- Designing strategies on how to approach the donors
- Negotiating roles with partners
- Facilitating partners/donors participation in programme development and implementation. Soon after the completion of programme document in February, more effort will be dedicated to this activity. The goal is to mobilize $US 1,500,000 to take the programme through the end of third phase. The deadline for this task is July 2000.

d) Needs assessment:

Short-term, long-term, and country case study needs assessment for programme development and implementations will be conducted.

e) Create awareness, promote support and establish rapport/collaboration with selected case study countries

There will negotiations with case study countries. An approach that enhances ownership of the project by participating countries will be adopted. I nstitutions within those countries will be identified, approached and their roles and responsibilities defined.

f) Programme implementation:

National workshops will be undertaken within each case study country. The workshops' objective will be to reshape the programme and build partnerships before implementation. The content of the project will be verified and estimated resource needs for implementation confirmed. Another important activity is the recruitment of a national implementing team including relevant institutions.

ANNEX I:
COPING WITH DROUGHT IN SUB-SAHARAN AFRICA - BEST USE OF CLIMATE INFORMATION
WORKSHOP PROGRAM

Kadoma Ranch Hotel and Conference Center
Zimbabwe
4-6 October 1999

Monday, 4 October

0800-0900 **Registration**

0900-0930 **Welcome**
P.S Ministry of Transportation, (for) Dr. S. Mayume
Mr. Isaya Higa, Environmental Specialist, UNDP Harare
Dr. M.V.K. Sivakumar, Chief, Agrometeorology Division, WMO
Mr. Tijan Jallow, Deputy Director, UNDP/UNSO

0930-1000 **COFFEE BREAK (and Group Photo)**

SESSION I:
INTRODUCTION AND BACKGROUND

1000-1030 **Background and workshop objectives**
Don Wilhite, NDMC and Peter Gilruth, UNDP/UNSO

1030-1130 **Presentation of Country Case Studies** (Moderator: Dr. Lucy Mwangi, UNDP/UNSO)

Country consultants (10 minutes each)
Dr. Robinson Kinuthia Ngugi-Kenya, Mr. Diarra Birama-Mali, Mr. Filipe Domingos Lucio-Mozambique, Mr. Gorgui Bamar Diagne-Senegal, Mr. Owen Shumba-Zimbabwe, Ethiopia (to be confirmed).

1130-1200 **Discussion**

1200-1330 **LUNCH**

SESSION II:

CLIMATE INFORMATION, PRODUCTS, SERVICES, AND USERS

1330-1500	**Users of Climate Information: Farmer and Agricultural Extension Panel** (Moderator: Mr. Malich Gning, Dept. Agriculture, Senegal)
	Farmers Mrs. C.Clark, Mrs. G. Sibanda, Mr. E. Chingwena, and Ms. W. Waboda
	Extension Officers
	Mr. R.P Tsikal and Mr. M. Chiwaridzo
1500-1520	**Wrap up session (Jennifer Phillips)**
1520-1540	**COFFEE BREAK**
1540-1610	**Interactions between Meteorological Services and Users in the Provision of Climate Information** (Moderator: Joseph Kimani, DMC/Nairobi)
	M.C. Zinyowera, Director, Department of Meteorological Services
1610-1640	**Use of Seasonal Climate Forecasts by Resource-limited Farmers**
	Jennifer Phillips, Center for Climate Systems Research, NASA/GISS and Columbia University
1640-1700	**Discussion**
1700-1715	**Wrap-up Session, Day 1 (Donald Wilhite, Peter Gilruth)**

Tuesday, 5 October

SESSION II:
CLIMATE INFORMATION, PRODUCTS, SERVICES AND USERS (continued)

0800-0815	**Plenary session (instructions to breakout groups)**

0815-0930 **Climate/Drought Information: A Review of Meteorological, Hydrological, and Agricultural Products and Delivery Services (Breakout Sessions)**

Purpose of breakout session is to identify the needs and constraints in climate information delivery from the perspective of the extension systems.

O930-1030 **Plenary Session: Summary of Breakout Group Discussions**
(Moderator: To be announced)

Chairs or rapporteurs from each group session summarize results with discussion.

1030-1100 **COFFEE BREAK**

1100-1130 **NOAA's Long-Lead Forecasts for Africa**
(moderator: Macol Stewart)
Wassila Thiaw, Africa Desk, Climate Prediction Center/NOAA.

1130-1200 **Constraints and Challenges of Climate Forecast Applications**

Kenneth Broad, International Research Institute for Climate Prediction (IRI)

1200-1230 **Discussion**

1230-1400 **LUNCH**

1400-1430 **Application of Seasonal Forecasts and Other Climate Information by Farmers in Decision Making: An Australian Case Study**
(moderator: TBA)
David White, ASIT Consulting, Canberra, Australia

1430-1445 **Discussion**

1445-1515 Building a Partnership with Climate Information and Prediction Services (CLIPS) Program

Michael Harrison, Chief, CLIPS Project Office, WMO

1515-1530 **Discussion**

1530-1600 **COFFEE**

1600-1730 **Climate-based Products and Services: Panel** (Moderator: Dr. M. Zinyowera, Zimbabwe Met. Dpt.

M. Boulahya, Directeur ACMAD
Owen Hughes, FAO
Peter Chola Hydrological Services, Zambia
Brad Garanganga, DMC

Panel will describe their experiences with climate forecasts and information products

1730-1745 **Wrap-up (Don Wilhite and Peter Gilruth)**

Evening **RECEPTION**

Wednesday, October 6

SESSION III:
TOWARDS A PROGRAMME ACTION PLAN

0800-0815 **Plenary Session (Instructions to break out sessions)**

0815-0945 **Breakout Group Sessions**

Purpose of breakout session is to determine elements for a programme to strengthen the orientation of climate/drought information products, information delivery, and training to meet user needs.

0945-1015 **Plenary Session: Summary of Breakout Group Discussions** (Moderator: Tijan Jallow)

Chairs or rapporteurs report results of their sessions with discussion.

1015-1045 **COFFEE BREAK**

1045-1200 Breakout Group Sessions

Purpose is to identify key players and actions at target levels (regional and national/local as priority)

1200-1230 Plenary Session: Breakout Groups report (Moderators: Macol Stewart and Peter Gilruth)

1230-1400 LUNCH

1330-1500 Discussion on Next Steps (Moderators: Tijan Jallow and M.V.K. Sivakumar)

1500-1530 COFFEE BREAK

1530-1600 Workshop Wrap-up

ANNEX II:
LIST OF WORKSHOP PARTICIPANTS

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UNITED NATIONS DEVELOPMENT PROGRAMME

ABOUT UNDP

The United Nations Development Programme is the UN's largest source of grant for development cooperation. Its funding is from voluntary contributions of Member States of the United Nations and affiliated agencies. A network of 132 country offices — and programmes in more than 170 countries and territories — help people to help themselves. In each of these countries, the UNDP Resident Representative normally also serves as the Resident Coordinator of operational activities for development of the United Nations system as a whole. This can include humanitarian as well as development assistance.

UNDP's main priority is poverty eradication. Its work also focuses on the closely linked goals of environmental regeneration, the creation of sustainable livelihoods, and the empowerment of women. Programmes for good governance and peace building create a climate for progress in these areas. Country and regional programmes draw on the expertise of developing country nationals and non-governmental organizations, the specialized agencies of the UN system and research institutes. Seventy-five per cent of all UNDP-supported projects are implemented by local organizations.

Ninety per cent of UNDP's core programme is focused on 66 countries that are home to 90 per cent of the world's extremely poor. UNDP is a hands-on organization with 85 per cent of its staff in the countries that it supports.

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